Puerto Rico Agricultural Experiment Station
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AGRICULTURAL NOTES

SEA-ISLAND COTTON IN PUERTO RICO AND ITS RELATION TO PRODUCTION IN THE CONTINENTAL UNITED STATES

BY

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PRODUCTION OF LONG-STAPLE COTTON WAS FORMERLY AN IMPORTANT INDUSTRY IN PUERTO RICO:

PRIOR TO 1932 THE PRODUCTION OF SEA-ISLAND COTTON WAS AN IMPORTANT INDUSTRY IN PUERTO RICO. APPROXIMATELY 20,000 ACRES WERE GROWN IN 1930 - 1931. ABOUT 12,000 OF THIS WAS GROWN ON THE SANDY AND SANDY-LOAM SOILS ALONG THE NORTH COAST FROM ARECIBO TO AGUADILLA, WHILE MOST OF THE BALANCE WAS GROWN ON THE SOUTH COAST ON HEAVIER SOILS AND UNDER DRIER CONDITIONS.

BECAUSE OF SUPPOSED DIFFERENCES IN RAINFALL DISTRIBUTION, THE COTTON-PLANTING SEASONS WERE REVERSED ON THE NORTH AND THE SOUTH COAST; ON THE NORTH THE SEASON EXTENDED FROM JANUARY AND FEBRUARY THROUGH AUGUST AND SEPTEMBER, WHILE ON THE SOUTH SIDE IT RAN FROM AUGUST TO MARCH AND APRIL.

THE PLANTINGS RANGED FROM SMALL GARDEN PLOTS, GROWN BY SMALL FARMERS, TO 400 ACRES ON LARGE PLANTATIONS. THE ENTIRE PRODUCTION WAS CONTROLLED BY THE SAN JUAN GINNERY COMPANY WHICH OPERATED THE ONLY GIN ON THE ISLAND, A 24-STAND GIN PLANT AT SAN JUAN. THIS COMPANY, A SUBSIDIARY OF THE SPOOL COTTON COMPANY OF NEW YORK, WHICH IS CONTROLLED BY THE CLARK THREAD COMPANY AND J. P. COATES THREAD COMPANY OF UNITED STATES AND EUROPE, FURNISHED THE SEED AND FERTILIZER, PROVIDED POISON FOR INSECTICIDES, ADVANCED MONEY ON THE CROP, BOUGHT THE COTTON IN THE SEED AND GINNED IT.

COTTON WAS OF HIGH QUALITY:

BECAUSE OF UNIFORM CONTROL MEASURES NEEDED TO COMBAT THE PINK BOLL WORM, AND THE FINANCIAL ASSISTANCE REQUIRED BY MANY OF THE GROWERS, THE SYSTEM OF CONTROLLED PRODUCTION UNDER THE SAN JUAN GINNERY PROVED SATISFACTORY. THE GINNERY ISSUED SEED

FOR PLANTING ONLY AT THE TIME WHEN THE COTTON SHOULD BE PLANTED AND STOPPED BUYING SEED COTTON AFTER A CERTAIN DATE, THUS FORCING THE GROWERS TO DESTROY THE COTTON STALKS AT A CERTAIN TIME AND PROVIDE A TWO-MONTH CLOSED SEASON BOTH ON THE NORTH AND SOUTH COASTS OF THE ISLAND. THUS EFFORTS WERE MADE TO HAVE CLOSED COTTON PERIODS ON EACH SIDE OF THE ISLAND IN ORDER TO CONTROL THE PINK BOLL WORM.

THE SAN JUAN GINNERY REQUIRED THE GROWERS TO SEPARATE THE SEED COTTON INTO FOUR GRADES: GRADE 1 WAS GOOD BRIGHT COTTON, FREE FROM TRASH OR STAINS; GRADE 2 WAS NOT QUITE AS GOOD AS 1; GRADE 3 CONTAINED DAMAGED LOCKS AND TRASH; AND GRADE 4 WAS COMPOSED OF COTTON BADLY STAINED BY COTTON STAINERS, INSECTS BELONGING TO THE GENUS DYSDERCUS. THE COTTON WAS THUS BOUGHT ON ITS MERITS AND THERE WAS AN INCENTIVE TO PRODUCE A HIGH-QUALITY PRODUCT. THE FIRST GRADE WAS EXCEPTIONALLY HIGH-QUALITY COTTON.

WORLD SURPLUS CAUSED LOW PRICES AND DISCONTINUANCE OF COTTON PLANTING:

FOR THE 1931 CROP THE GINNERY GUARANTEED A PRICE OF $9\frac{1}{2}$ CENTS PER POUND FOR THE FIRST-GRADE SEED COTTON. BY 1931 A 20,000-BALE SURPLUS OF EXTRA-LONG-STAPLE SEA ISLAND HAD BEEN BUILT UP IN THE WEST INDIES, AND THE SAN JUAN GINNERY FOUND THAT THEY COULD BUY THE COTTON CHEAPER IN THE OPEN MARKET THAN AT THE GUARANTEED PRICE OF $9\frac{1}{2}$ CENTS. THEY, THEREFORE, ANNOUNCED THAT THE PRICE WOULD HAVE TO BE DROPPED TO $6\frac{1}{2}$ CENTS PER POUND THE FOLLOWING SEASON. AS A RESULT PRODUCTION WANED, THE COMPANY DISCONTINUED OPERATIONS, AND EXPORTS CEASED.

TOWARD THE LATTER YEARS OF PRODUCTION THE SEED STOCKS HAD BEGUN TO DETERIORATE; MUCH SLICK OR "PELON" SEED WITH LITTLE LINT BEGAN TO SHOW UP, AND THE SEED STOCKS ALSO BECAME BADLY MIXED WITH THE NATIVE WILD TREE COTTON.

INSULAR EXPERIMENT STATION HAS MAINTAINED AND IMPROVED STRAINS OF LONG-STAPLE COTTON:

AUTHORITIES OF THE PUERTO RICAN INSULAR DEPARTMENT OF AGRICULTURE, FORESEEING THE POSSIBILITY OF REVIVAL OF THE SEA-ISLAND INDUSTRY, TRIED TO OBTAIN SEED FROM SOME OF THE BRITISH WEST INDIES, BUT COULD NOT. WORK WAS THEN STARTED TO SELECT A UNIFORM HIGH-QUALITY SEA ISLAND OUT OF THE MIXED STOCK IN PUERTO RICO. SEVERAL THOUSAND PLANT SELECTIONS WERE MADE AND THESE WERE PLANTED IN PROGENY ROWS. THE MOST PROMISING PLANTS WERE SELF-POLLINATED AND SELECTION CONTINUED, UNTIL TODAY, FROM THE APPEARANCE OF THE STOCK IN THE BREEDING BLOCKS AT THE INSULAR EXPERIMENT STATION AT RIO PIEDRAS, THE STOCKS LOOK VERY UNIFORM IN BOLL AND PLANT CHARACTERS.

TWO STOCKS HAVE BEEN DEVELOPED, ONE HAVING A STAPLE LENGTH OF $1\frac{3}{4}$ - $1\frac{7}{8}$ INCHES, AND A LINT PERCENTAGE OF 29, THE SECOND A STAPLE OF $2\frac{1}{8}$ INCHES OR LONGER AND A LINT PERCENTAGE OF 26. BOTH STOCKS ARE FINE, SILKY AND PROLIFIC. THESE STOCKS WILL BE INCREASED AS QUICKLY AS POSSIBLE, AND SEED MADE AVAILABLE TO GROWERS TO TAKE THE PLACE OF THE STOCKS NOW BEING PLANTED. THE LATTER STOCKS WHICH ARE INCREASES FROM EARLIER SELECTIONS ARE NOT ENTIRELY UNIFORM. WHILE THE STAPLE IS GENERALLY $1\frac{3}{4}$ INCHES LONG, SOME PLANTS HAVE STAPLE AS SHORT AS 1-3/8 INCHES. MUCH SLICK OR "PELON" TYPE SEED WAS ALSO NOTED, AND THERE IS ALSO SOME DIVERSITY IN PLANT AND BOLL CHARACTERS. APPROXIMATELY 1400 ACRES ON THE NORTH COAST AND 750 ACRES ON THE SOUTH COAST WERE PLANTED THIS SEASON WITH THIS SEED.

AGRONOMIC PRACTICES CAN BE IMPROVED:

ON THE PRESENT SURVEY FIELDS WERE INSPECTED ON BOTH COASTS. THE PLANTINGS WERE GENERALLY UNIFORM IN APPEARANCE, THOUGH IN SOME FIELDS THE PLANTS LOOKED MORE UNIFORM THAN IN OTHERS, AND THERE SEEMED TO BE SOME DIFFERENCE IN THE UNIFORMITY OF FIBER IN THE DIFFERENT FIELDS ON THE NORTH COAST. IN THE NORTH, PICKING HAD BEEN COMPLETED IN MOST FIELDS AND IN MANY PLACES THE STALKS HAD BEEN DESTROYED. FROM THE APPEARANCE OF THE PLANTS, THE PLANTINGS SEEMED TO HAVE BEEN FAIRLY PRODUCTIVE. THE CULTURAL PRACTICES APPEARED GOOD, THOUGH IN SOME PLANTINGS THE SPACING WAS RATHER CLOSE FOR BEST RESULTS. WITH THE EXCEPTION OF ONE FIELD, THE PLANTINGS WERE GENERALLY HEALTHIER LOOKING ON THE NORTH COAST.

ON THE SOUTH COAST SEVERAL VERY GOOD AND SEVERAL VERY POOR PLANTINGS WERE INSPECTED. IN ONE FIELD OF 25 ACRES AT SABANA GRANDE, PLANTED IN SEPTEMBER, THE COTTON PLANTS WERE ABOUT 3 FEET HIGH, AND VERY WELL FRUITED. THE SOIL WAS HEAVY AND BROWNISH-BLACK. NO FERTILIZER HAD BEEN USED. ANOTHER PLANTING, ON ROLLING LAND, WHICH WAS NOT AS FERTILE, AND ON WHICH NO FERTILIZER HAD BEEN USED, DID NOT LOOK QUITE AS GOOD.

INTERPLANTING WITH OTHER CROPS INDIRECTLY FAVORS PINK BOLL WORM:

THE POORER PLANTINGS WERE INVARIABLY THOSE WHERE COMPANION CROPPING WITH CORN WAS BEING PRACTICED. THE COTTON ROWS WERE $3\frac{1}{2}$ TO 4 FEET APART WITH ONE OR MORE PLANTS IN HILLS SPACED $3\frac{1}{2}$ TO 4 FEET APART, OR SOMETIMES CLOSER, AND CORN PLANTED BETWEEN EACH ROW OF COTTON OR EVERY THIRD ROW. MUCH OF THE CORN WAS PRACTICALLY MATURE, BUT IN SOME FIELDS IT WAS STILL YOUNG. IN ALL CASES THE COTTON WAS BEING CROWDED OUT AND HAD LITTLE CHANCE OF MAKING A FAIR OR ANY YIELD. WHEREVER THERE WAS ROOM THE COTTON HAD TAKEN ADVANTAGE OF THE SPACE AND WAS DEVELOPING NORMALLY.

COMPANION CROPPING BETWEEN COTTON AND CORN IS A POOR AGRICULTURAL PRACTICE, FOR IT APPARENTLY REACTS HARMFULLY UPON BOTH CROPS. ESPECIALLY UNDER PINK-BOLL-WORM CONDITIONS IT IS BAD, FOR IT RETARDS PRODUCTION, WHEREAS EVERY MEANS SHOULD BE TAKEN TO PRODUCE A QUICK CROP BEFORE THE INITIAL INFESTATION BUILDS UP. IT IS IMPORTANT TO PRODUCE THE CROP QUICKLY, TO DESTROY THE STALKS AS SOON AS POSSIBLE TO PREVENT PINK-BOLL-WORM BREEDING, AND TO HAVE AS LONG A CLOSED SEASON AS POSSIBLE BETWEEN HARVESTING AND THE NEXT PLANTING. COMPANION CROPPING OF ANY KIND WITH COTTON, THEREFORE, SHOULD BE DISCOURAGED. ONE REASON FOR IT THE PAST SEASON WAS THE UNCERTAINTY OF A SATISFACTORY MARKET FOR THE COTTON AND THE NEED OF A FOOD CROP IN THE EVENT AN INCOME COULD NOT BE OBTAINED FROM THE COTTON.

SEED TREATMENT AND FERTILIZER APPLICATIONS COULD BE ADVANTAGEOUSLY STUDIED:

FROM THE APPEARANCE OF SOME OF THE PLANTINGS OF COTTON AND CORN ON SOME OF THE LIGHT SANDY SOILS ADJACENT TO THE COAST ON THE SOUTHWEST SIDE OF PUERTO RICO, THE SOILS WERE RATHER INFERTILE AND PROBABLY WOULD RESPOND TO APPLICATIONS OF FERTILIZER.

SOME OF THE SEA-ISLAND PLANTINGS ON THE SOUTH SIDE, ESPECIALLY NEAR THE COAST, WERE BADLY AFFECTED BY ANGULAR LEAF SPOT. MANY OF THE PLANTS WERE BADLY STUNTED, OR HAD BEEN KILLED AND THE STAND BADLY DAMAGED. IN SECTIONS WHERE PLANTINGS ARE SUBJECT TO THIS DISEASE, SEED TREATMENT WITH SOME OF THE MERCURY-DUST PREPARATIONS SHOULD BE

RECOMMENDED. SUCH TREATMENT HAS BEEN IMPORTANT IN HOLDING THE DISEASE IN CHECK IN MANY PARTS OF CONTINENTAL UNITED STATES. SEA-ISLAND SEED HAS RELATIVELY LITTLE FUZZ, AND COULD BE TREATED WITH SUCH DUSTS WITHOUT DELINTING.

COTTON IS A CROP WHICH SHOULD MEET THE ECONOMIC NEEDS OF PUERTO RICO:

UNDER PRESENT ECONOMIC CONDITIONS IN PUERTO RICO, MONEY CROPS OF HIGH VALUE PER ACRE ARE NEEDED. BECAUSE OF THE DENSE POPULATION AND THE GREAT AMOUNT OF UNEMPLOYMENT, CROPS ARE NEEDED, THE PRODUCTION COSTS OF WHICH ARE PRINCIPALLY FOR LABOR RATHER THAN FOR FERTILIZER, PACKAGES OR MACHINERY. THE CROPS ALSO SHOULD BE ADAPTABLE TO SMALL AS WELL AS LARGE HOLDINGS, AND SHOULD BE OF A NON-PERISHABLE NATURE SO THAT THEY CAN BE HELD, IF NECESSARY, FOR A SATISFACTORY MARKET. THERE ARE ADVANTAGES IN STAPLE COMMODITIES ON WHICH MONEY CAN BE ADVANCED SAFELY, OR WHICH CAN BE USED AS COLLATERAL. COTTON FILLS ALL THESE REQUIREMENTS. THE NEED FOR ITS PRODUCTION AND THE PLACE IT SHOULD FILL IN PUERTO RICO IS GIVEN IN THE FOLLOWING MEMORANDUM:-

MEMORANDUM OF A CONVERSATION BETWEEN MR. LUIS A. SERRANO
DIRECTOR OF THE ISABELA AGRICULTURAL EXPERIMENT SUBSTATION
AND MR. D. S. MYER OF THE A.A.A., UNITED STATES DEPARTMENT OF AGRICULTURE

"SUBJECT: COTTON GROWING IN PUERTO RICO.

"PUERTO RICO CAN PRODUCE SEA-ISLAND COTTON WHICH IS BOTH THE LONGEST-STAPLE AND THE HIGHEST-PRICED COTTON IN THE WORLD.

"THIS TYPE OF COTTON CANNOT BE PRODUCED IN THE CONTINENT AND IT SEEMS DESIRABLE TO DEVELOP ITS PRODUCTION IN PUERTO RICO, FIRST BECAUSE IT DOES NOT COMPETE WITH THE SHORT-STAPLE COTTON PRODUCED IN THE CONTINENTAL UNITED STATES, AND SECOND BECAUSE IT WOULD UTILIZE LARGE TRACTS OF AGRICULTURAL LANDS, NUMEROUS LABORERS, AND WOULD PROVIDE AN INCOME TO ALL THOSE WHO MAY BECOME ENGAGED IN ITS PRODUCTION, TRANSPORTATION AND INDUSTRIALIZATION.

"DURING PAST YEARS PUERTO RICO PRODUCED SEA-ISLAND COTTON. AVERAGE PRODUCTION PER ACRE HAS VARIED DUE TO (A) LACK OF CREDIT TO PURCHASE THE NECESSARY FERTILIZING AND SPRAYING MATERIALS AND (B) DUE TO THE VARYING DEGREES OF INFESTATION OF PINK BOLL WORM.

"PUERTO RICO HAS PLANTED NO COTTON DURING THE LAST THREE YEARS BECAUSE THE ONLY PURCHASING AGENCY, THE SAN JUAN GINNERY, DISCONTINUED BUSINESS IN THE ISLAND. DURING THIS PERIOD PINK-BOLL-WORM INFESTATION HAS BEEN GREATLY REDUCED, AS OBSERVED IN THE SMALL PLANTINGS WHICH HAVE BEEN MADE EVERY YEAR TO CONSERVE THE SEED. IT SEEMS QUITE POSSIBLE TO ELIMINATE THIS PEST FROM THE ISLAND BY ERADICATION OF ALL THE HOST PLANTS.

"ONE THOUSAND POUNDS OF SEED COTTON PER ACRE COULD BE EASILY OBTAINED IN PUERTO RICO IF THE PINK BOLL WORM IS HELD UNDER CONTROL AND FARMERS ARE PROVIDED WITH THE NECESSARY CREDIT TO BUY FERTILIZER AND SPRAYING MATERIALS. THIS IS EQUAL TO ABOUT 270 POUNDS LINT.

"COST OF PRODUCTION IS RATHER HIGH IN PUERTO RICO BECAUSE (A) COTTON HAS ALWAYS BEEN GROWN IN SMALL FARMS; (B) THE PRICE OF LAND IS HIGH AND SO TAXES ARE HIGH; (C) LABOR-SAVING EQUIPMENT HASN'T BEEN IN GENERAL USE BECAUSE OF LACK OF CAPITAL; (D) FERTILIZER AND SPRAYING MATERIALS ARE HIGH PRICED; ESPECIALLY FOR SMALL FARMERS WHO BUY SMALL QUANTITIES.

"ACCORDING TO FIGURES SHOWN, COST OF PRODUCTION, INCLUDING FIXED CHARGES, AND TRANSPORTATION TO THE RAILROAD DEPOT ON THE BASIS OF 1000 POUNDS SEED COTTON PER ACRE, IS AROUND SIX CENTS PER POUND FOR SEED COTTON OR APPROXIMATELY 22 CENTS PER POUND FOR LINT.

"IT IS NOT ADVISABLE TO RENEW COTTON PLANTING IN PUERTO RICO ON THE BASIS OF SELLING TO A PURCHASING AGENT, AS WAS DONE PREVIOUSLY, BECAUSE IT LEAVES THE INDUSTRY IN THE HANDS OF ONLY ONE PARTY. THERE CANNOT BE ANY STABILITY TO COTTON GROWING IN THIS MANNER, NOR CAN THE GROWERS EVER OBTAIN A FAIR PRICE FOR THEIR PRODUCT.

"A FAR BETTER ARRANGEMENT WOULD BE TO ESTABLISH IN PUERTO RICO MILLS OWNED COOPERATIVELY BY THE FARMERS OR EVEN OWNED PRIVATELY BY INDIVIDUALS OR COMPANIES INTERESTED IN THE INDUSTRIAL PART ONLY. THIS WOULD PROVIDE THE NEEDED STABILITY TO COTTON GROWING IN PUERTO RICO, AND IT WOULD PROVIDE EMPLOYMENT TO THE PEOPLE.

"IT IS WELL TO REMEMBER THAT A COMPANY USING THIS TYPE OF COTTON WOULD HAVE VERY LITTLE COMPETITION AND WOULD MANUFACTURE THE HIGHEST-PRICED COTTON GOODS KNOWN, SUCH AS LACE, SEWING THREAD AND HIGH-TENSION FABRICS NEEDED FOR THE MANUFACTURE OF AIRPLANES AND RUBBER TIRES.

"IT SEEMS REASONABLE TO BELIEVE THAT THE MANUFACTURE AND SALE OF THESE HIGH-QUALITY GOODS PRODUCED WITH RELATIVELY LOW-PRICE LABORERS, WOULD BE HIGHLY PROFITABLE AND THEREFORE IT WOULD PERMIT THE MAINTENANCE OF PROFITABLE PRICES FOR THE COTTON PLANTERS."

PINK BOLL WORM IS GREATEST LIMITING FACTOR:

ONE OF THE GREATEST LIMITING FACTORS IN THE PRODUCTION OF SEA-ISLAND COTTON IN PUERTO RICO IS THE PINK BOLL WORM. THIS PEST IS VERY DIFFICULT TO CONTROL BECAUSE INFESTATION BUILDS UP FAIRLY RAPIDLY IN THE FIELDS. EVEN THOUGH THERE HAS BEEN LITTLE PRODUCTION OF SEA ISLAND FOR THE PAST THREE YEARS, THE INFESTATION IN SOME FIELDS LATE IN THE SEASON THIS YEAR HAS BEEN AS HIGH AS 95 PERCENT ACCORDING TO MR. L. C. FIFE OF THE BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE, UNITED STATES DEPARTMENT OF AGRICULTURE, WHO IS STUDYING PINK BOLL WORM IN PUERTO RICO. IT HAS A NUMBER OF HOST PLANTS OTHER THAN COTTON. ACCORDING TO MR. FIFE, THERE ARE THREE PHASES OF CONTROL: 1. MEASURES WHICH INVOLVE THE ACTUAL GROWING AND HANDLING OF THE SEA-ISLAND CROP; 2. MEASURES TO CONTROL THE PEST ON HOST PLANTS OTHER THAN SEA-ISLAND COTTON; 3. BIOLOGICAL MEASURES OR THE INTRODUCTION OF PARASITIC INSECTS.

QUICK BOLL PRODUCTION AND EARLY HARVESTING AVOID HEAVY INFESTATION:

UNDER THE FIRST HEAD, CONTROL CONSISTS MAINLY IN PRODUCING THE CROP QUICKLY, DESTROYING THE STALKS AS SOON AS POSSIBLE AFTER PICKING, HAVING A UNIFORM CLOSED

SEASON THROUGHOUT THE ISLAND WHEN THERE SHOULD BE NO COTTON GROWN, AND STERILIZING ALL SEED AS SOON AS IT IS GINNED TO KILL ALL LONG-CYCLE OR RESTING LARVAE IN THE SEED.

THERE ARE SEVERAL FACTORS INVOLVED IN THE EARLY PRODUCTION OF A CROP, SUCH AS THE PROPER PLANTING DATE, THE PROPER CULTURAL PRACTICES, AND THE PROPER FERTILIZER. THERE IS PROBABLY ALSO SOME RELATION BETWEEN SPACING AND RAPIDITY OF FRUITING. ON THE BREEDING SIDE, THE POSSIBILITY OF DEVELOPING AN EARLY, QUICK-FRUITING TYPE WITH A DETERMINATE HABIT OF GROWTH SHOULD NOT BE OVERLOOKED. UNDER PINK-BOLL-WORM CONDITIONS, WHERE ONLY A LIMITED TIME IS AVAILABLE IN WHICH TO SET A CROP BEFORE IT IS TIME TO DESTROY THE STALKS, A PLANT HAVING A DETERMINATE GROWTH HABIT WOULD BE AN ADVANTAGE. WHERE INFESTATION IS HEAVY, MOST OF THE LATE BOLLS ARE DESTROYED, AND THERE IS NO ADVANTAGE IN THE PLANTS FRUITING LATE.

WITH A LAW REQUIRING A CLOSED SEASON THERE IS INSUFFICIENT TIME FOR THE LATE BOLLS TO MATURE BEFORE THE TIME COMES TO DESTROY THE PLANTS. THE CLEAN-UP CAMPAIGN INVOLVES PULLING AND BURNING THE STALKS, AND DESTROYING ANY COTTON RUBBISH IN THE FIELDS. AT THE END OF THE SEASON THE GINS SHOULD BE THOROUGHLY CLEANED, AND ALL SEED WHICH HAS NOT BEEN TREATED SHOULD BE STERILIZED. STERILIZATION BY HEAT IS NOT BEING USED IN PUERTO RICO, BUT RATHER TREATMENT WITH CARBON DISULPHIDE. HEAT TREATMENT IS BEING USED BY THE BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE IN THE CONTINENTAL UNITED STATES AND MIGHT PROVE MORE SATISFACTORY THAN FUMIGATION IN PUERTO RICO. THE COST OF THE EQUIPMENT IS NOT EXPENSIVE.

ELIMINATION OF PLANTS RELATED TO COTTON WHICH HARBOR BOLL WORM IS DIFFICULT:

ACCORDING TO MR. FIFE, THE PROBLEM OF CONTROLLING PINK BOLL WORM ON HOST PLANTS OTHER THAN SEA-ISLAND COTTON IS VERY DIFFICULT BECAUSE OF THE NATURE AND THE DISTRIBUTION OF THESE HOSTS. A CAMPAIGN HAS BEEN GOING ON FOR TWO YEARS TO DESTROY ALL THE WILD COTTON ON THE ISLAND. THIS MAJOR UNDERTAKING IS BEING CARRIED ON BY THE PUERTO RICO EMERGENCY RELIEF ADMINISTRATION. WHILE THE DESTRUCTION HAS NOT BEEN COMPLETE, THE WORK IS STILL GOING FORWARD, AND WHAT HAS BEEN DONE ALREADY SHOULD HELP NOT ONLY IN PINK-BOLL-WORM CONTROL, BUT IN PRESERVING THE PURITY OF THE SEA-ISLAND SEED STOCKS BY PREVENTING MIXTURE OF THE SEA-ISLAND STRAINS WITH NATIVE COTTON. SINCE PLANTS COME UP FROM TIME TO TIME FROM SEEDS WHERE THE OLD WILD COTTON PLANTS WERE, THE FOLLOW-UP CAMPAIGN IN DESTRUCTION OF THE WILD COTTON IS IMPORTANT IF THE DESTRUCTION IS TO BE COMPLETE AND IS TO HAVE LASTING VALUE.

THERE ARE SEVERAL PLANTS IN PUERTO RICO WHICH MAY SERVE AS HOSTS FOR THE PINK BOLL WORM. THE PRINCIPAL HOST, OTHER THAN COTTON, IS THESPESIA GRANDIFLORA, COMMONLY CALLED MAGA, WHICH OCCURS COMMONLY AND IS WIDELY DISTRIBUTED ON THE ISLAND. ACCORDING TO MR. FIFE, PINK BOLL WORM HAS BEEN FOUND IN THE GREEN MATURE SEED CAPSULES OF THIS PLANT. SINCE THIS TREE IS USEFUL FOR FURNITURE, FENCE POSTS, AND SUCH THINGS, IT COULD HARDLY BE DESTROYED. CEIBA PENTANDRA, OR SILK COTTON TREE, IS ALSO A POSSIBLE SOURCE OF INFESTATION. OF THE SHRUBS, SOME OF THE HIBISCUS ARE A POSSIBLE SOURCE OF INFESTATION. OKRA IS GROWN IN GARDEN PLOTS OVER THE ISLAND, AND IS ALSO GROWN COMMERCIALLY. AT A CERTAIN STAGE OF DEVELOPMENT, THE PODS HAVE BEEN FOUND TO BE INFESTED. IT WOULD BE VERY DIFFICULT TO DESTROY ALL THESE HOST PLANTS, BUT SOME MEASURE OF CONTROL MIGHT BE OBTAINED BY DESTRUCTION IN THE VICINITY OF SEA-ISLAND PLANTINGS.

Bureau of Entomology and Plant Quarantine Has Imported Beneficial Insects Which Parasitize Pink Boll Worm:

The control of the pink boll worm by parasites has been started. The Bureau of Entomology and Plant Quarantine of the United States Department of Agriculture brought several thousand specimens of two beneficial species from Texas which were liberated the past season in cotton fields on the north coast; Dr. K. A. Bartlett has been in charge of these insect importations. Mr. Fife states that after allowing time for these insects to propagate they were recovered, showing that they had become established. He states that there may be some difficulty in continued establishment since the parasites need the pink boll worm in their life cycle. The critical period in the existence of the parasite is during the closed season when no cotton is supposed to be grown. It remains to be seen whether the parasites can continue existence by parasitizing pink boll worm in host plants other than sea-island cotton.

Cooperative Marketing Association Is Supporting the Reestablishment of the Long-Staple Industry:

The present production of sea-island cotton in Puerto Rico is under the control of the Puerto Rico Marketing Association for Minor Crops, a growers' organization interested in the agricultural development of minor crops. The organization seems to be very active, and has a very public-spirited gentleman as president, Mr. José Rafols Roger of Isabela. Mr. Rafols Roger is an outstanding business man, who seems to understand the problems of production, and is willing to do everything possible to re-establish the sea-island industry on the Island. It is his policy to have the Association act in much the same capacity as the San Juan Ginnery did in furnishing sterilized seed, fertilizer, and financial assistance.

The Association is now buying the seed cotton, having it ginned, and advancing money on the cotton. At the beginning of the season the Association entered into an agreement with the Clark Thread Company of Newark, New Jersey for 75 percent of the crop produced on the north coast. The average price for the past crop has been 29.5 cents per pound. As long as a satisfactory market is uncertain, such an agreement direct with a mill is a distinct advantage, but with the reestablishment of the industry it might be more advantageous to sell in the open market.

Some of the most important phases of sea-island production are in the proper picking, sorting of the seed cotton into grades, and proper ginning. The first two steps are being well handled in Puerto Rico, and a fair job of ginning is being done, but it could be improved by certain changes and adjustments of the gins. Some of the rollers are being too deeply and widely grooved, and as a result seed is being cracked.

Association Will Operate Its Own Ginnery and Control Seed Stocks, Fertilizers and Financing:

The San Juan Ginnery at San Juan is being bought by the Puerto Rico Department of Agriculture and Commerce, and has been loaned to the Puerto Rico Marketing Association for Minor Crops. In controlling the seed stocks and the gin, the Association ia in a position to control the entire production on the Island. As a growers' organization,

IF THE ASSOCIATION IS RUN FOR THE INTEREST OF THE SMALL GROWERS AS WELL AS THE LARGE, IT SHOULD BE AN IDEAL ARRANGEMENT. ON SUCH A BASIS, IF THE PROPER PROVISION IS MADE FOR BREEDING AND INCREASING SEED STOCKS, A ONE-VARIETY COMMUNITY PRODUCTION COULD FUNCTION SATISFACTORILY. BECAUSE OF THE UNIFORM CONTROL MEASURES NEEDED TO COMBAT THE PINK BOLL WORM, PRODUCTION CONTROLLED BY A RESPONSIBLE ORGANIZATION IS VERY IMPORTANT.

PUERTO RICAN LONG-STAPLE COTTON DOES NOT COMPETE WITH COTTON PRODUCTION ON CONTINENT:

EFFORTS ARE NOW BEING MADE TO REVIVE THE SEA-ISLAND COTTON INDUSTRY IN THE OLD AREAS OF PRODUCTION IN SOUTHEASTERN UNITED STATES. UNDER BOLL-WEEVIL CONDITIONS THE POSSIBILITIES OF PRODUCTION ARE HAZARDOUS. DURING VERY FAVORABLE SEASONS FAIR YIELDS MAY BE EXPECTED, BUT UNDER UNFAVORABLE CONDITIONS THE CHANCES ARE THAT PRODUCTION WOULD BE VERY SMALL. SATISFACTORY PRICES FOR THE LINT CANNOT BE EXPECTED SO LONG AS A REGULAR SUPPLY IS UNCERTAIN, FOR MILLS CANNOT OPERATE SATISFACTORILY UNDER SUCH CONDITIONS, AND CANNOT BE EXPECTED TO SHOW A CONTINUED INTEREST IN THE FIBER. A PUERTO RICAN PRODUCTION SHOULD HELP RATHER THAN HINDER PRODUCTION POSSIBILITIES IN CONTINENTAL UNITED STATES, SINCE SUCH PRODUCTION WOULD HELP TO STABILIZE THE SUPPLY. IN CONSIDERING THE REESTABLISHMENT OF THE INDUSTRY, THEREFORE, THE PRODUCTION IN THE CONTINENTAL UNITED STATES AND ON THE ISLAND SHOULD BE CONSIDERED TOGETHER.

ALTHOUGH MANUFACTURING METHODS HAVE NOW BEEN DEVELOPED FOR SUBSTITUTING UPLAND COTTON FOR LONG STAPLE TO SOME EXTENT IN SUCH INDUSTRIES AS TIRE MANUFACTURING AND THREAD MAKING, AN ABSENCE OF AN ADEQUATE SUPPLY OF LONG-STAPLE COTTON WILL ULTIMATELY HANDICAP UNITED STATES MANUFACTURERS WHO ARE IN COMPETITION WITH MANUFACTURERS OF OTHER COUNTRIES TO WHOM LONG STAPLE IS AVAILABLE. FOR THIS REASON IT SEEMS LOGICAL THAT A REGULAR SUPPLY OF AMERICAN-GROWN LONG-STAPLE COTTON SHOULD BE AVAILABLE TO THE MANUFACTURERS OF SPECIAL ARTICLES IN THE CONTINENTAL UNITED STATES. THE PRESENT PROTECTIVE TARIFF ON LONG-STAPLE COTTON IN THE UNITED STATES SHOULD FAVOR SUCH MANUFACTURERS BY INSURING A REGULAR SUPPLY OF THIS COTTON AND SHOULD HELP THE REVIVING PUERTO RICAN SEA-ISLAND INDUSTRY.

WORLD SURPLUS OF LONG-STAPLE COTTON HAS NOW DISAPPEARED:

IN A REVIVAL OF THE INDUSTRY THE TYPE OF SEA ISLAND WHICH IS NEEDED TO FILL THE MARKET DEMANDS IS IMPORTANT. PRIOR TO THE ADVENT OF THE BOLL WEEVIL INTO SOUTHEASTERN CONTINENTAL UNITED STATES AND THE DESTRUCTION OF THE SEA-ISLAND INDUSTRY THERE, MOST OF THE SEA ISLAND WAS PRODUCED IN SOUTH GEORGIA AND NORTH FLORIDA. THE TYPE PRODUCED WAS OF MEDIUM QUALITY WITH A STAPLE OF $1\frac{1}{2}$ TO $1\frac{5}{8}$ INCHES.

THE PRODUCTION OF "CROP LOT" SEA ISLAND, OR EXTRA-STAPLE SEA ISLAND OF $1\frac{3}{4}$ INCHES AND OVER, WAS LIMITED TO COASTAL CAROLINA AND GEORGIA, AND THE MARKET DEMANDS WERE SMALL AS COMPARED TO THE DEMAND FOR THE SHORTER TYPE. THE INTEREST WHICH HAS BEEN SHOWN IN THE UNITED STATES IN RECENT YEARS HAS BEEN FOR THE SHORTER RATHER THAN THE EXTRA-LONG STAPLE. AT THE TIME THE INDUSTRY DECLINED IN PUERTO RICO THERE WAS A LARGE SUPPLY OF EXTRA-LONG STAPLE SEA ISLAND FOR WHICH THERE WAS NO DEMAND. IT IS IMPORTANT THAT SEED STOCKS OF BOTH TYPES BE DEVELOPED, AND INCREASED TO THE EXTENT OF THE DEMAND FOR THE TYPE. THE TENDENCY IN PUERTO RICO SEEMS TO BE TOWARD THE PRODUCTION OF THE EXTRA-LONG-STAPLE TYPE.

THE LARGE SURPLUS OF EXTRA-LONG-STAPLE SEA ISLAND HAS NOW DISAPPEARED. SEA-ISLAND GOODS HAVE BEEN PUT ON SALE IN SPECIAL STORES IN ENGLAND WHERE THEIR MERITS HAVE BEEN ADVERTISED. THE BRITISH ARE NOW ENCOURAGING THE PLANTING OF SEA ISLAND IN THEIR WEST INDIAN ISLANDS WHICH WOULD SEEM TO INDICATE A REVIVED MARKET. INTEREST IN PRODUCTION IN FLORIDA AND GEORGIA HAS INCREASED, AND THE CROP OF ABOUT 166 BALES THERE HAS BEEN SOLD AT 25 TO 28 CENTS PER POUND.

CONTINENTAL COTTON-BREEDING PROGRAM CAN BE ACCELERATED BY UTILIZING PUERTO RICAN CLIMATE:

IMPORTANT LIMITING FACTORS IN PUERTO RICO AND THE CONTINENTAL UNITED STATES ARE INSECT PESTS, THE PINK BOLL WORM, THE COTTON STAINER, AND THE BOLL WEEVIL, THE LAST MENTIONED ONLY ON THE CONTINENT. IN BOTH PLACES BREEDING OF SPECIAL TYPES MAY PLAY AN IMPORTANT PART IN COMBATING THESE PESTS. WORK HAS BEEN STARTED IN THE UNITED STATES IN HYBRIDIZING LONG STRAINS OF SEA ISLAND AND LONG STRAINS OF UPLAND COTTON IN THE HOPE OF DEVELOPING A TYPE RESISTANT TO THE BOLL WEEVIL WITH THE FIBER CHARACTERS OF SEA ISLAND. THIS WORK COULD BE MATERIALLY SHORTENED IF TWO CROPS COULD BE PRODUCED IN ONE SEASON. THERE MAY BE POSSIBILITIES IN THIS CONNECTION IF A PUERTO RICAN CROP COULD BE PRODUCED DURING THE OFF SEASON AND THE SEED BROUGHT TO THE UNITED STATES FOR PLANTING IN THE SPRING. IF A SEA-ISLAND-UPLAND TYPE COULD BE DEVELOPED, IT MIGHT BE USEFUL BOTH IN THE CONTINENTAL UNITED STATES AND PUERTO RICO.